Cancer patterns in four districts of the Transkei region — 1991 - 1995

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Background. Oesophageal cancer (OC) is an important public health problem among the Xhosa-speaking people of the Transkei region in the Eastern Cape Province, South Africa, with incidence rates for males among the highest in the world.

Objectives. To record the occurrence of cancer among men and women of all ages in four districts in the Transkei during the period 1991 - 1995, to identify common cancers and to compare the variations in cancer incidences in this region with incidences in Africa and the rest of the world.

Design. Cancer registration of cases reported from all clinics and hospitals was conducted in the four selected districts.

Setting. The districts included Centane (Kentani), Butterworth, Bizana and Lusikisiki in the Transkei region.

Methods. Active and passive methods were used to collect data, which were analysed using the Statistical Analyses Systems (SAS) package.

Results. The mean annual number of all cancer cases reported was 310, with age-standardised incidence rates (ASIRs, world standard) of 98.2 / 100 000 and 74.3 / 100 000 for males and females, respectively. The most frequently reported cancer was OC, with mean annual ASIRs of 76.6 / 100 000 and 36.5 / 100 000 for males and females, respectively, with a male / female ratio of 2:1.

Conclusion. The present data confirm previous reports that OC rates in Centane have consistently remained very high, whereas time-dependent changes in the incidence of OC have occurred in Butterworth, Bizana and Lusikisiki suggesting changes in the risk determinants in these districts.

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An increase in the incidence of oesophageal cancer (OC) among the Xhosa-speaking people of the Transkei region of the Eastern Cape province of South Africa was first noticed and reported by Burrell in 1957.[1] In 1992 this disease was reported to be an important public health problem in South Africa.[2] With an age standardised incidence rate (ASIR) of 25.17 / 100 000 and a lifetime risk (LR) of 1 in 33, black South African males rate among the highest in the world for this condition. In South Africa, data on the incidence of histologically diagnosed cancer are published by the National Cancer Registry.[2-7]

Detailed data on the incidence of cancer in different districts of the Transkei region have been published since 1955.[8-11] The aim of the Transkei registry was to provide basic data on the spatial and temporal variations in cancer patterns in the region, particularly with regard to OC. Initially, all medically confirmed OC cases in the 26 districts of the Transkei region were recorded. From 1981, a limited population-based cancer registry was restructured and concentrated on the incidence of OC in four selected districts. The reason for this was that during the period 1955 - 1969, major differences in the incidence rates of OC in different districts of Transkei were recorded, with the rates in the south-western districts of Butterworth and Centane (Kentani) reported to be much higher than in the north-eastern districts of Bizana and Lusikisiki.[8, 12] The population groups in the north-eastern districts are comparatively more affluent and less traditional than in Centane. In contrast, Butterworth district has a fast-growing urbanised population.[10]

Recent reports have indicated that OC trends in three of the districts are changing as rates decrease in Butterworth and progressively increase in Bizana and Lusikisiki, while remaining consistently high in Centane.[10, 11] This paper reports on the incidence trends for OC and other cancers in four selected districts of the Transkei region for the period 1991 - 1995.

Materials and methods

Case finding was based on active collection of cancer data[13] from the medical records of all major hospitals located in the four districts. This component involves regular visits (twice per

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year) to hospitals located in the four districts and in certain neighbouring districts, including Umtata General Hospital (the regional referral centre). Medical records were scrutinised to check for completion of the notifications, and missing or incomplete records were updated. The information recorded for each case, using specially designed notification forms, included name and surname, age, sex, address, hospital number, clan name, primary cancer site, and radiograph and biopsy numbers. Trained voluntary hospital personnel collected and recorded all the information required on cancer registration and mailed this to PROMEC (the Programme on Mycotoxins and Experimental Carcinogenesis) on a monthly basis. Cases comprised only residents defined as having lived in these districts for at least 6 months. A uniform information collection process was ensured by discussing problems that arose during visits to the hospitals and clinics.

Data were computerised and coded at the time of entry, following the tumour nomenclature and coding for topography and morphology.[14] After correcting for duplicates, the data were analysed using the Statistical Analyses Systems (SAS) package. The Adjust Age software programme (ADJAGE)[15] was used to calculate the age-standardised incidence rates (ASIRs) (world standard)[16] per 100 000 per annum for each sex using the mean estimated annual population figures based on the 1996 census figures for the four districts.[17] The ASIRs (using the African standard) were also calculated and included to adjust for differences in the number of people in the various age categories between developed and developing countries for comparative purposes.[18] All ASIR data based on the African rather than the world standard are specified in the text, tables and figures.

Results and discussion

A total of 1 553 cancer cases were reported in the four districts during the period 1991 - 1995, with the mean annual number being 310. The overall mean annual rates for all cancers were 98.2 / 100 000 and 74.3 / 100 000 for males and females, respectively (Table I). Histopathological confirmation was obtained for only 8.4% (ranging from 0.8% to 18.4% per annum) of the reported tumours, while radiograph reports were available for 20.2% (ranging from 9.2% to 27.7% per annum). In contrast, Makaula *et al.*[11] reported that during the period 1985 - 1990, histopathological confirmation was obtained for 52.6% of reported tumours. A similar calculation for the period 1985 - 1990 using the same database[11] revealed that 30.3% (ranging from 0% to 47.8% per annum) of the cancer cases were histopathologically confirmed and 62.7% (ranging from 20.3% to 81.1% per annum) had undergone radiographic examination.

The most frequently reported cancer was OC, with 914 cases reported for both males (76.6 / 100 000) and females (36.5 / 100 000), with a male / female ratio of 2:1 (Table II). The highest OC incidence rates in males occurred in Centane (61.8 / 100 000), while similar incidence rates were reported in Lusikisiki (57.6 / 100 000) and Butterworth (53.6 / 100 000). The lowest OC incidence rate in males was reported in Bizana (33.4 / 100 000). Among females the highest OC incidence rate was reported in Centane (50.0 / 100 000) followed by Lusikisiki (48.4 / 100 000) and Bizana (29.0 / 100 000), with the lowest rate (18.4 / 100 000) recorded in Butterworth (Table II).

The present data were also calculated to reflect the African standard because of remarkable differences in the age profiles of developed versus developing countries[18]. In developing countries such as Zimbabwe and South Africa (Transkei) the average population aged above 30 years is much lower than in a developed country where the life expectancy is far higher. Adjustment of the present ASIR data to reflect the world standard resulted in higher OC incidence rates in all the districts except Bizana (Table II). The ranking of the four districts remained the same, with the highest OC rates for males and females recorded in Centane. The HIV / AIDS epidemic in southern Africa will most probably further distort the ASIR of OC, as it will dramatically affect the population indices in the Transkei region and will therefore further complicate the use of the world standard in Africa.

Table I. Annual age-standardised incidence rates (ASIRs) for all reported cancers in four districts of Transkei during 1991 - 1995

	ASIR / 100 000											
	1991		1992		1993		1994		1995		Mean	
District	M	F	M	F	M	F	M	F	M	F	M	F
Bizana	98	54	12	83	15	92	54	27	22	31	40.2	57.4
Lusikisiki	98	93	13	164	85	118	102	94	124	88	84.4	111.4
Butterworth	65	45	157	28	63	38	60	39	33	30	75.6	36.0
Centane	154	115	386	47	238	110	114	68	70	121	192.4	92.2
Overall mean											98.2	74.3

M = male; F = female.

Table II. Annual age-standardised incidence rates (ASIRs) for oesophageal cancer in four districts of the Transkei during 1991-1995*

District	Reported cases (1991-1995)	Estimated population† M	Estimated population† F	ASIR/100 000‡ 1991 M	1991 F	1992 M	1992 F	1993 M	1993 F	1994 M	1994 F	1995 M	1995 F	Mean M	Mean F
Bizana	150	77 218	110 177	89	27	12	37	7	48	37	13	22	20	33.4	29.0
				(63)	(15)	(9)	(21)	(6)	(26)	(25)	(7)	(11)	(14)	(22.8)	(16.6)
Lusikisiki	340	95 360	123 206	70	38	13	98	59	53	48	32	98	21	57.6	48.4
				(40)	(23)	(6)	(58)	(37)	(30)	(29)	(21)	(56)	(13)	(33.6)	(29.0)
Butterworth	142	68 696	87 601	57	29	99	12	39	13	41	22	32	16	53.6	18.4
				(37)	(16)	(71)	(7)	(21)	(5)	(24)	(17)	(16)	(8)	(33.8)	(10.6)
Centane	282	36 054	48 528	132	77	315	15	202	49	102	24	58	85	161.8	50.0
				(69)	(49)	(180)	(9)	(109)	(35)	(58)	(13)	(30)	(54)	(89.2)	(32.0)
Overall mean														76.6	36.5
														(44.9)	(22.1)

*Values in parentheses represent ASIRs calculated using the African standard.
†Mean estimated population from 1991 to 1995 (see Materials and methods section).
‡Values were calculated using the estimated population for each year.
M = male; F = female.

Liver cancer was the second most common cancer reported in males (2.2/100 000), whereas it was the lowest cancer recorded in females (1.2/100 000) (Table III). Incidence rates in the four districts ranged between 0.8/100 000 and 5.6/100 000 in males and between 0/100 000 and 3.4/100 000 in females, with the highest incidence rates recorded in both sexes in Lusikisiki. Cervical (22.2/100 000) and breast cancers (2.6/100 000) were the second and third commonest cancers reported in females. The highest incidence rate for cervical cancer was reported in Lusikisiki (41.6/100 000), while for breast cancer the highest rates were recorded in Centane (4.0/100 000) and Lusikisiki (3.2/100 000). The rates for cervical cancer are comparable to rates from the National Cancer Registry of South Africa reports for 1990 - 1991 (ASIR 35.4/100 000),[5] 1992 (ASIR 30.5/100 000),[6] 1993 - 1995 (ASIR 31.2/100 000)[7] and those published in 1993 for the Transkei (ASIR 17.5/100 000).[19] Very low incidence rates for other cancers including prostate, stomach, lung, etc. were reported in both sexes in the four districts.

Table III. Mean age-standardised incidence rates (ASIRs) for liver, cervical and breast cancers in four districts of the Transkei during 1991-1995

District	ASIR/100 000 Liver M	Liver F	Cervical F	Breast F
Bizana	0.8	1.2	17.6	1.8
	(0.4)	(0.8)	(12.0)	(1.4)
Lusikisiki	5.6	3.4	41.6	3.2
	(4.0)	(2.6)	(28.0)	(2.8)
Butterworth	0.4	0.0	9.8	1.4
	(0.8)	(0.0)	(7.4)	(1.0)
Centane	1.8	0.0	19.8	4.0
	(0.8)	(0.0)	(12.6)	(3.2)
Mean	2.2	1.2	22.2	2.6
	(1.5)	(0.9)	(15.0)	(2.1)

*Values in parentheses represent ASIRs calculated using the African standard.
M = male; F = female.

When considering the cancer incidence trends in the four districts during the past 15 years, changes in the estimated population profiles have to be taken into account. In Centane, the population did not change much during the period 1981 - 1995 and remained remarkably constant for both males and females.[11] A similar trend was noticed in Butterworth, except that the male and female populations almost doubled during the 1991 - 1995 period compared with the 1985 - 1990 period.[11] In the two north-eastern districts of Bizana and Lusikisiki, the population of both males and females has increased steadily over the past 15 years.[10, 11] The ASIR data using the African standard were used for comparative purposes to evaluate the trends for breast, cervical and liver cancer during the past 15 years (Figs 1 and 2), and the OC cancer pattern over the past 40 years (Fig. 3). There was a remarkable increase in the incidence of breast cancer in Centane and Lusikisiki (Fig. 1a), while the incidence of cervical cancer tended to decrease in Butterworth and remained consistently high in Lusikisiki (Fig. 1b). The incidence of liver cancer has increased markedly in Lusikisiki in both males (Fig. 2a) and females (Fig. 2b), while it remained low in the other districts. In Butterworth and Centane very low incidence rates for liver cancer were recorded among females during the past 15 years.

The incidence pattern of OC in Centane has remained the same for the past 40 years, and the ASIRs for both males and females in this district were the highest of the four selected districts (Fig. 3). In Butterworth, the incidence rates for both

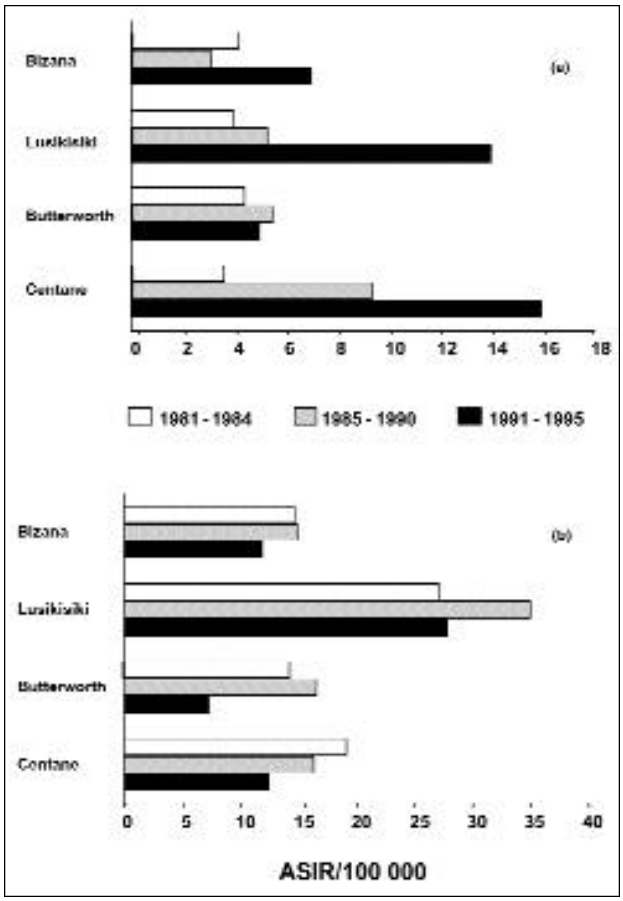

Fig. 1. Age-standardised incidence rates (African standard) for breast (Fig. 1a) and cervical (Fig. 1b) cancer in four districts of the Transkei region (1981 - 1995).

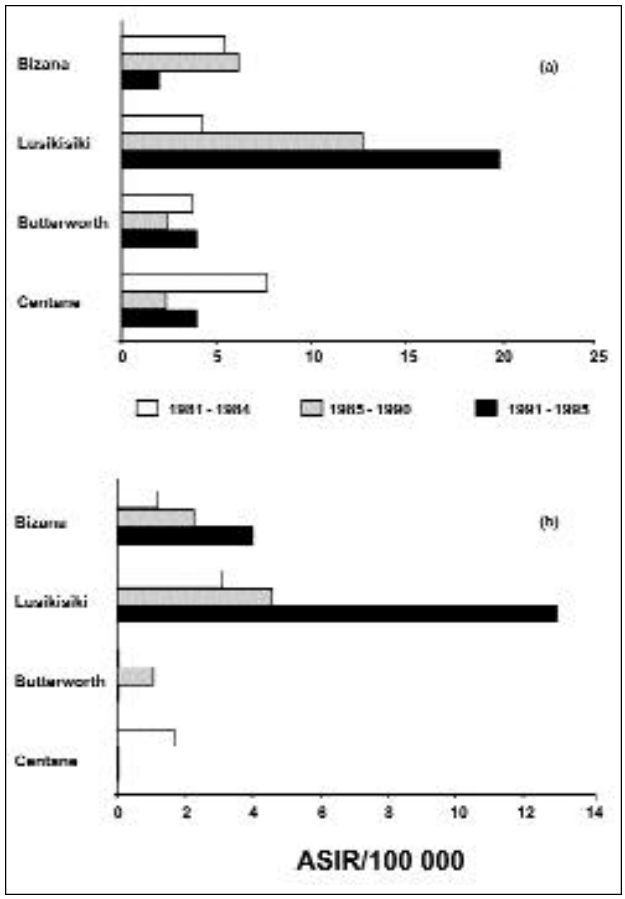

Fig. 2. Age-standardised incidence rates (African standard) for liver cancer in males (Fig. 2a) and females (Fig. 2b) in four districts of the Transkei region (1981 - 1995).

males and females are progressively decreasing when compared with the early reports published for 1955 - 1959[8] and 1965 - 1969,[9] but have tended to stabilise over the last 15 years. In contrast, the incidence rates of OC in both males and females in Bizana and Lusikisiki have increased progressively. In Bizana and Lusikisiki the ASIR for males increased to similar levels reported in Butterworth and Centane during the period 1985 - 1990.[11] In females the ASIRs markedly increased in Lusikisiki and Bizana and closely mimic the rates in Centane, over the past 10 years.

Data on the cancer incidence patterns between 1996 and 2000 have recently been compiled and show similar trends with regard to OC in Centane for males and females.[20] The altered OC patterns, reflected by an increase in Bizana and Lusikisiki and a decrease in Butterworth in both males and females, were confirmed. Cervical cancer is still the highest in Lusikisiki, while comparable rates were noted in the other districts. In contrast, the highest rates of breast cancer were reported in Butterworth, while rates were markedly decreased in Centane and Lusikisiki. No change was observed in Bizana. The high incidence rates of liver cancer in males and females in Lusikisiki during the 1991 - 1995 period were not confirmed as they were similar to those recorded in the other districts. However the absence of liver cancer among females in Butterworth and Centane was confirmed.

Cancer incidence patterns in the Transkei have common features with those of other African countries. The most common cancers in males were OC and liver cancer, and in females OC and cervical cancer predominated while breast cancer was increased. These rates are comparable to rates for the African population in Harare, Zimbabwe.[21] However, when using the world standard in males, both OC and liver cancers had high incidence rates (30.4/100 000 and 34.6/100 000, respectively), as did cervical and breast cancers in females (67.0/100 000, 10.8/100 000, respectively). In another study in South Africa, the OC incidence rate among black goldminers almost doubled from 8.0/100 000 (1980 - 1989) to 14.8/100 000 (1990 - 1994 period).[22] Conversely, the National Cancer Registry of South Africa, which conducts a histopathology-based cancer registry, reflects decreasing incidence rates of OC

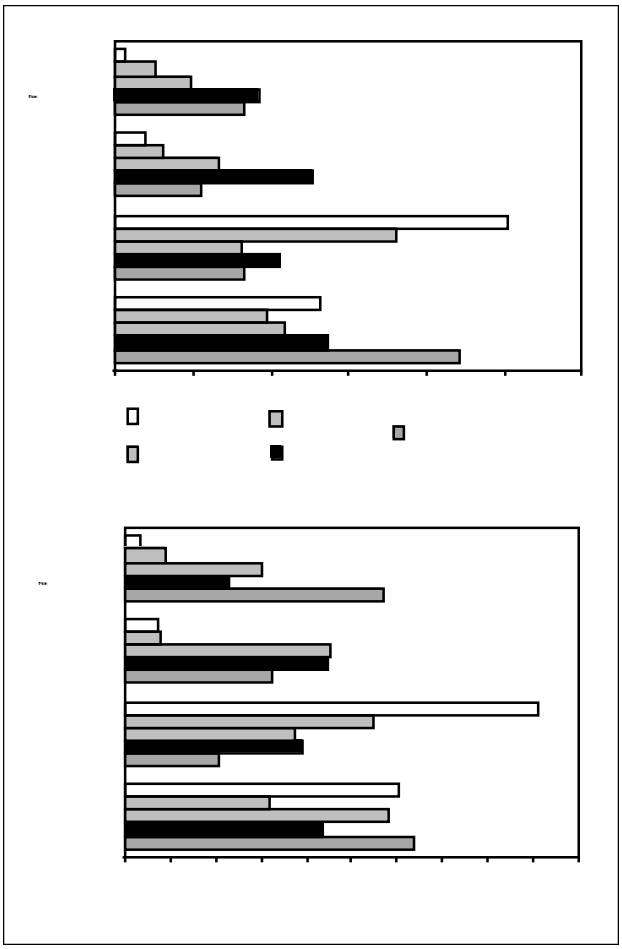

Fig. 3. Age-standardised incidence rates (African standard) for oesophageal cancer in males (Fig. 3a) and females (Fig. 3b) in four districts of the Transkei region (1955 - 1995).

for both males and females as published in the reports for 1990,[5] 1992[6] and 1993 - 1995.[7] A possible reason may be the decrease in the mean percentage of histopathologically confirmed cases reported in this study when compared with previous reports by Jaskiewicz *et al.*[10] and Makaula *et al.*[11] In contrast, the mean annual number of cancer cases did not decrease during the periods 1985 - 1990 (292)[11] and 1991 - 1995 (310, present study). It is not known whether similar decreases in histopathological confirmations exist in other pathology laboratories that serve as referral bases for the National Cancer Registry.

Patterns of OC incidence rates in the four districts under study have changed drastically since the first report by Rose.[8] Many speculative hypotheses can be developed including economic, social, cultural or traditional practices. Scientists, clinicians, nutritionists and anthropologists are greatly challenged to find reasons for the changing patterns of the disease in the four districts. Further development of this limited population-based cancer registry is imperative to include all new cancer cases for each district. This will greatly improve our knowledge of unbiased estimates of cancer incidence and survival while important aetiological and epidemiological studies can be conducted in this region.

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References

1. Burrell RJW. Oesophageal cancer in the Bantu. *S Afr Med J* 1957; **31:** 401-409.
2. Sitas F. *National Cancer Registry of South Africa: Incidence of Histologically Diagnosed Cancer in South Africa, 1988.* Johannesburg: South African Institute for Medical Research, 1992.
3. Sitas F, National Cancer Registry of South Africa. *Annual Report 1987.* Johannesburg: South African Institute for Medical Research, 1987.
4. Sitas F, Pacella R. *National Cancer Registry of South Africa: Incidence and Geographical Distribution of Histologically Diagnosed Cancer in South Africa, 1989.* Johannesburg:South African Institute for Medical Research, 1994.
5. Sitas F, Terblanche M, Madhoo J. *National Cancer Registry of South Africa: Incidence and Geographical Distribution of Histologically Diagnosed Cancer in South Africa, 1990 and 1991.* Johannesburg: South African Institute for Medical Research, 1996.
6. Sitas F, Blaauw D, Terblanche M, Madhoo J, Carrara H. *National Cancer Registry of South Africa. Incidence of Histologically Diagnosed Cancer in South Africa, 1992.* Johannesburg: South African Institute for Medical Research, 1997.
7. Sitas F, Madhoo J, Wessie J. *National Cancer Registry of South Africa. Incidence of Histologically Diagnosed Cancer in South Africa, 1993 - 1995.* Johannesburg: South African Institute for Medical Research, 1998.
8. Rose EF. Oesophageal cancer in the Transkei:1955 - 1969. *J Natl Cancer Inst* 1973; **51:** 7-16.
9. Rose EF, Mcglashan ND. The spatial distribution of oesophageal carcinoma in the Transkei, South Africa. *Br J Cancer* 1975; **31:** 197-206.
10. Jaskiewicz K, Marasas WFO, Van der Walt FE. Oesophageal and other main cancer patterns in four districts of Transkei, 1981 - 1984. *S Afr Med J* 1987; **72:** 27-30.
11. Makaula N, Marasas WFO, Venter FS, Badenhorst CJ, Bradshaw D, Swanevelder S. Oesophageal and other cancer patterns in four selected districts of Transkei, Southern Africa: 1985 - 1990. *Afr J Health Sci* 1996; **3:** 11-15.
12. Rose EF, Fellingham SA. Cancer patterns in Transkei. *S Afr J Sci* 1981; **77:** 555-556.
13. Jensen OM, Parkin DM, Maclenan R, Muir CS, Skeet RG. *Cancer Registration: Principles and Methods.* IARC Scientific Publication No. 95. Lyon: IARC, 1991: 7-8.
14. Percy CL, Berg JW, Thomas LB, eds. *Manual of Tumor Nomenclature and Coding.* Geneva: American Cancer Society, 1968.
15. Arriaga EE. *Population Analysis With Microcomputers Software and Documentation.* II, New York: United Nations, 1994.
16. Parkin DM, Whelan SL, Ferlay J, Raymond L, Young J. *Cancer Incidence in Five Continents.* VII. IARC Scientific Publication No 143. Lyon: IARC 1997.
17. Central Statistical Service. *Age by Development Region, Statistical Region and District.* Pretoria: Central Statistical Services; Report No: 03-01-30, 1996.
18. Gray A. *World Health and Disease.* Buckingham: Open University Press, 1993.
19. Banach L, Stepien A. The most common cancers in Transkeian adults by histological diagnosis. *S Afr Med J* 1993; **83:** 808.
20. Somdyala NIM. Cancer surveillance, a missing link in the health care delivery system of South Africa. MDS dissertation, University of the Free State, 2002.
21. Bassett MT, Chokunonga E, Mauchaza B, Levy L, Ferlay J, Parkin DM. Cancer in the African population of Harare, Zimbabwe, 1990 - 1992. *Int J Cancer* 1995; **63:** 29-36.
22. Mcglashan ND, Harington JS. Cancer in black gold miners, 1980 - 89 and 1990 - 94: The Chamber of Mines of South Africa's records of cancer. *S Afr J Sci* 2000; **96:** 249-251.